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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/773,311

02/09/2004

Akio Kawabata

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KRATZ, QUINTOS & HANSON, LLP
1420 K Street, N.W.
Suite 400
WASHINGTON, DC 20005

EXAMINER

DIAZ, JOSE R

ART UNIT

PAPER NUMBER

2815

MAIL DATE

DELIVERY MODE

03/09/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/773,311	Applicant(s) KAWABATA ET AL.	
	Examiner JOSE R. DIAZ	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 6-36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/24/09</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 18, 2008 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Awano (US 2002/0163079 A1) in view of Hoppe et al. (US 2002/0167375 A1).

Regarding claims 1, 4 and 5, Awano discloses a semiconductor device comprising:

a first wiring copper layer (12) [Fig. 1 and paragraph 0075],
an interlayer insulating film (13) over the first wiring copper layer [Fig. 1],
a second wiring copper layer (14) formed on the interlayer insulating film [Fig. 1 and paragraph 0075], and

a wiring via (15) formed in the interlayer insulating film (13) to electrically connect the first wiring copper layer (12) to the second wiring copper layer (14) [Fig. 1 and paragraph 0075],

wherein the wiring via (15) comprising:

a layer of a catalyst metal (18) being formed on the first wiring copper layer [Fig. 2C and paragraph 0076];

a carbon element cylindrical structure body (16) incorporating therein the catalyst metal at the root [Fig. 1 and paragraph 0076].

Awano essentially discloses the claimed invention except for a layer of alloy of a catalyst metal and a second metal different from the catalyst metal, a layer of carbide of the second metal formed on the layer of alloy, and a carbon element cylindrical structure body incorporating therein the catalyst metal, and that the side wall of the carbon element cylindrical structure body is formed on the layer the layer of carbide.

Hoppe teaches an alloy layer (Ti/Ni alloy) comprising a catalyst metal (Ni) and a second metal (Ti) different from the catalyst metal [paragraph 0051], which is formed on the first wiring layer (20) [Fig. 1]. Regarding the limitation about the layer of carbide of the second metal, it is noted that titanium is simultaneously carbidized with the growth of carbon nanotubes, hence the carbon element cylindrical structure body (18) is also formed on a layer of carbide. In addition, it is noted that Hoppe teaches the same process and catalyzing/alloy material disclosed by applicant (Page 8, lines 30-36 of applicant's specification). Hence, Hoppe makes obvious the new limitations by teaching the same process and catalyst material as disclosed by applicant.

Regarding claim 3, Hoppe teaches that the second metal is Ti [paragraph 0051].

Hoppe and Awano are analogous art because they are from the same field of endeavor as applicant's invention. At the time of the invention it would have been obvious to a person of ordinary skill in the art to include a layer of alloy of a catalyst metal and a second metal different from the catalyst metal, the layer being formed on the first wiring copper layer, a layer of carbide of the second metal formed on the layer of alloy, and a carbon element cylindrical structure body incorporating therein the catalyst metal, the body being formed on the layer of carbide. The motivation for doing so, as is taught by Hoppe, is enhancing the geometry of the nanotube arrays (paragraph 0051). Therefore, it would have been obvious to combine Awano with Hoppe to obtain the invention of claims 1, and 3-5.

Regarding claim 2, Awano discloses wherein the catalyst metal is Ni or Co [paragraph 0076].

Response to Arguments

4. Applicant's arguments with respect to claims 1-5 have been considered but are moot in view of the new ground(s) of rejection.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSE R. DIAZ whose telephone number is (571)272-1727. The examiner can normally be reached on Monday through Thursday.

Art Unit: 2815

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kenneth A Parker/
Supervisory Patent Examiner, Art Unit 2815

/J. R. D./
Examiner, Art Unit 2815